PTO 06-5698

CY=JA DATE=19900404 KIND=A
PN=02-093781

PARKING LOT-MANAGING DEVICE WITH FUNCTION DEDICATED FOR SHORT-TERM PARKING
[Tanjikan Sen'yo Chusha Kinotsuki Chushajo Kanri Sochi]

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UNITED STATES PATENT AND TRADEMARK OFFICE
Washington, D.C. July 2006

Translated by: FLS, Inc.

PUBLICATION COUNTRY	(19):	JP
DOCUMENT NUMBER	(11):	02093781
DOCUMENT KIND	(12):	A
PUBLICATION DATE	(43):	19900404
APPLICATION NUMBER	(21):	63245823
DATE OF FILING	(22):	19880929
INTERNATIONAL CLASSIFICATION	(51):	G07B 15/00
DOMESTIC CLASSIFICATION	(52):	
PRIORITY COUNTRY	(33):	
PRIORITY NUMBER	(31):	
PRIORITY DATE	(32):	
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TITLE	(54):	PARKING LOT-MANAGING DEVICE WITH FUNCTION DEDICATED FOR SHORT-TERM PARKING
FOREIGN TITLE	[54A]:	TANJIKAN SEN'YO CHUSHA KINOTSUKI CHUSHAJO KANRI SOCHI

Specifications /623*

1. Title of the Invention

PARJUBG KIT-MANAGING DEVICE WITH FUNCTION DEDICATED FOR SHORT-TERM PARKING

2. Claim(s)

A parking lot installed with a ticketing machine which issues a parking ticket on which the parking garage-entering time has been recorded at the parking garage entrance and calculates a parking fee on the basis of the parking garage-entering time read from the above-mentioned parking ticket at the parking garage exit, and an automatic fee-adjusting machine which enables leaving of a parking garage by opening an exit gate if payment of this parking fee is received; said parking lot-managing device with a function dedicated for short-term parking characterized by providing a parking space dedicated for short-term parking having a separate parking garage entrance in the above-mentioned parking lot, installing, at the parking garage entrance for the above-mentioned parking space, a short-term ticketing machine which issues parking tickets dedicated for short-term parking on which the parking garage-entering time has been recorded, and also, calculating a no-cost parking fee low fee for short-term dedicated use when the parking ticket inserted in the automatic fee-adjusting machine installed at the above-mentioned parking garage entrance is a parking ticket dedicated for short-term parking, and moreover, providing a short-term use fee-calculating means which calculates a penalty charge that is higher than the general fee when the parking garage-leaving time

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exceeds a predetermined regulated time for the short-term dedicated use parking.

3. Detailed Specifications

(Field of Industrial Application)

The present invention relates to a parking lot managing device able to automatically perform management of the entering/leaving of vehicles from a parking garage, and the calculation, collection, and the like of the parking fee, and in particular, a parking lot-managing device provided with a function for being able to manage a parking garage for short-term dedicated use of, e.g., about 30 minutes.

(Prior Art)

A conventional parking garage was managed by applying common conditions of use to any paying customer regardless of the length of time of use (parking time).

That is, approximately 30-minute short-term paying customers, approximately 1- to 3-hour standard paying customers, and 3-hour or longer long-term paying customers (called "general paying customers") were lumped together as parking garage paying customers. In the past, these paying customers parked at entirely the same conditions of use. /624

(Problems to be Solved by the Invention)

However, among the aforementioned various paying customers, the proportion of short-term paying customers was fairly high, the vehicles of these short-term paying customers that repeatedly entered/exited the parking garage and parked frequently arrived along with the general parking

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[1]Number in the margin indicates pagination in the foreign text.

vehicles, which caused congestion at the parking garage entrance. In particular, various problems occurred because there was a large amount of dissatisfaction from the general paying customers, and the parking efficiency declined.

Consequently, a technical issue of the present invention was to enhance the parking efficiency by mitigating the congestion of the parking garage to manage it by separating the short-term paying customers and the general paying customers by different conditions of use.

(Means for Solving the Problems)

The means taken to solve the above-mentioned technical issues according to the present invention are as follows:

In a parking lot installed with a ticketing machine which issues a parking ticket on which the parking garage-entering time has been recorded at the parking garage entrance and calculates a parking fee on the basis of the parking garage-entering time read from the above-mentioned parking ticket at the parking garage exit, and an automatic fee-adjusting machine which enables leaving of a parking garage by opening an exit gate if payment of this parking fee is received, parking spaces dedicated for short-term parking having a separate parking garage entrance in the above-mentioned parking lot are provided, a short-term ticketing machine is installed at the parking garage entrance for the above-mentioned parking space to (1) issue parking tickets dedicated for short-term parking on which the parking garage-entering time has been recorded, (2) calculate a no-cost parking fee low fee for short-term dedicated use when the parking ticket inserted in the automatic fee-adjusting machine installed at the

above-mentioned parking garage entrance is a parking ticket dedicated for short-term parking and (3) provide a short-term use fee-calculating means which calculates a penalty charge that is higher than the general fee when the parking garage-leaving time exceeds a predetermined regulated time for the short-term dedicated use parking.

(Effects)

The above means has the following actions.

(1) The key elements given in (1) above are to mitigate congestion at the parking garage entrance by partitioning the entrance of the parking garage for general use and for short-term use, and also, to enable that short-term parking spaces can be guaranteed for use at a relatively large utilization rate.

(2) The key element given in (2) above is to define the partition for the general paying customers by issuing a parking ticket for short-term dedicated use at the parking entrance for the short-term paying customers.

(3) The key element given in (3) above is to give preferential treatment to the short-term paying customers having a high frequency of use and turnover by setting the parking fee for short-term parking at no cost or a low fee for short-term dedicated use, but prevent parking for more than a regulated time by collecting a penalty charge fairly higher (about 2 to 3 times) than that of the general parking fee when leaving the parking garage past a predetermined regulated time (e.g., about 30 minutes) to enable enhancement of the parking efficiency.

(Practical Examples)

Ideal practical examples of the aforementioned parking lot-managing

device with a function dedicated for short-term parking pertaining to the present invention will now be described in detail along with the appended drawings.

Figure 1 is a schematic block diagram of a parking garage provided with the parking lot-managing device pertaining to the present invention. The interior of the parking garage denoted wholly by the reference symbol **1** is formed by dividing into general parking spaces **1A** and short-term dedicated parking spaces **1B** with partitions **2**. Devices for managing the entering of the parking garage are provided respectively at parking garage entrances **1m** and **1ms** of the respective parking spaces **1A** and **1B**, and moreover, a device for managing leaving of the garage is provided at a common parking garage exit **1e** for the respective parking space **1A** and **1B**.

4 and **9** in the drawing are ticketing machines for parking tickets installed respectively at the respective parking garage entrances **1m** and **1ms** and **6** and **11** are 1st entrance vehicle sensors provided on the entrance side of the respective parking garage entrances **1m** and **1ms**. They are constructed to do the following. When these sensors **6** and **11** sense vehicles that have approached (see arrow), sensing signals **f1** and **f4** from the sensors **6** and **11** are inputted into the ticketing machines **4** and **9**, and the ticketing machines **4** and **9** issue respective parking tickets **P** and **PS** based on these signals **f1** and **f4**. Next, if paying customers take the parking tickets **P** and **PS** thus issued out through the ticket slots **4a** and **9a**, gate-opening signals **f2** and **f5** from the ticketing machines **4** and **9** are inputted /625 into entrance gates **5** and **10**, and these entrance gates **5** and **10** open entrance

gate bars **5G** and **10G** on the basis of these signals **f2** and **f5** to enable the vehicles to enter the parking garage. In addition, **7** and **12** are 2nd vehicle sensors at the entrances which comprise loop coils provided in the entryways inside the above-mentioned entrance gate bars **5G** and **10G**. When vehicles having entered the garage are sensed by passing these sensors **7** and **12**, they output gate-closing signals **f3** and **f6** to the above-mentioned entrance gate bars **5** and **10**, which close the entrance gate bars **5G** and **10G** close and entering of the parking garage is completed here.

Figures 2A and 2B are front views of the parking tickets **P** and **PS** issued from the respective above-mentioned ticketing machines **4** and **9**. Of these parking tickets composed of electromagnetic cards, a parking garage entrance time is recorded on an electromagnetic stripe **Pm** of the parking ticket **P** issued from the ticketing machine **4** at the general parking garage entrance **1m**, and moreover, the regulated time (e.g., 30 minutes) is recorded along with the parking garage entrance time on the electromagnetic stripe **Pm** of the parking ticket **PS** issued from the ticketing machine **9** at the short-term parking garage entrance **1ms**.

13 in Fig. 1 is an automatic fee-adjusting machine provided at the parking garage exit **1e** of the parking garage **1**. This automatic fee-adjusting machine **13** is constructed to enable insertion of the parking ticket **P** or **PS** therein by opening a parking ticket insertion slot **13a**, and enable insertion of the parking ticket **P** or **PS** by opening the parking ticket insertion slot **13a** when it receives a vehicle sensing signal **f7** outputted by a 1st vehicle sensor **15** at the garage exit. When the inserted parking

ticket is the parking ticket **P**, normally this machine reads the aforesaid parking garage-entering time data recorded and displayed on the electromagnetic stripe **Pm**. The difference in time between this parking garage-entering time and the current time (parking garage-leaving time) is calculated, the parking fee is then calculated out in the standard parking fee mode, this calculated parking fee is displayed on a display device. The paying customer (driver) inserts the moneys corresponding to the parking fee thus displayed into a fee insertion slot **13b**. When he/she has finished paying, this inserted parking ticket **P** is recovered inside the fee-adjusting machine, on the one hand, and outputs a gate-opening signal **f8** to an exit gate opening/closing crossing gate **14** to open a exit gate bar **14G** to enable the vehicle to leave the parking garage.

16 is a 2nd vehicle sensor at the exit comprising a loop coil or the like provided on the exit side of the parking garage exit **1e**. It is constructed to output a gate-closing signal **f9** to the exit gate opening/closing crossing gate **14** at the exit if the vehicle leaving the parking garage passes this sensor **16** upon opening of the exit gate bar **14G**, this exit gate bar **14G** is closed again, and the leaving the parking garage is completed.

It is moreover constructed to calculate the parking fee safely when the parking ticket **PS** for short-term dedicated use is inserted into the automatic fee-adjusting machine **13** of the above-mentioned parking garage exit **1e**. In special instances, it is adjusts the fee to be no-cost. Otherwise, it reads the regulated time and judges whether or not the vehicle is leaving the parking garage within the regulated time. When the regulated

time is exceeded, it calculates the penalty charge that is 2 to 3 times higher than the regular fee, and displays it on a display device to indicate the fee to be paid.

Figure 3 is a block diagram of the configuration of the control section of the above-mentioned automatic fee-adjusting machine **13** composed of a microcomputer. **20** is a CPU; **21** is a memory RPM in which system programs are stored. The aforementioned 1st and 2nd vehicle sensors **15** and **16** and exit gate opening/closing crossing gate **14** are connected to an interface circuit **22** connecting these CPU **20** and memory **21**, and further, a clock device **23**, card sensor **24**, card feed motor **25**, card reader **26**, display device **27** and a cash-adjusting machine **28**, which calculates change or the like by counting the paid cash, are connected thereto. All of these parts are composed so as to be controlled by the CPU **20** in accordance with the programs stored in the aforesaid memory **21**.

Figure 4 is a flowchart [misspelled in source] used for describing the procedure of the processing for entering the short-term parking garage executed by the parking garage entering-managing device provided at the parking garage entrance **1ms** dedicated for short-term use. Except for issuing the parking ticket **PS** dedicated for short-term parking performed in a 2nd step S2, the procedure is the same as that for a processing executed at the general parking garage entrance **1m**.

Moreover, Fig. 5 is a flowchart used for describing a procedure for a processing in which a vehicle is leaving the parking garage by using the parking ticket **P** or **PS**. When it is judged that the parking ticket

inserted in step S14 is a general parking ticket **PS**, we proceed to step S15 where the parking fee is calculated in the standard parking fee mode. However, if it is judged that it is the short-term dedicated use /626 parking ticket **P**, we proceed to step S21 where it is judged whether or not the current time is within the regulated time recorded on the electromagnetic stripe **Pm**. When it is within the regulated time, we proceed to step S22 where a low parking fee (or at no cost) is calculated in the short-term parking fee mode. When the regulated time is exceeded, we proceed to step S23 where a penalty charge that is 2 to 3 times higher than the regular fee is calculated.

In addition, the processing operation in each of the other steps is the same as that of a conventional parking lot managing device; hence, a description thereof will be omitted.

(Advantages)

Due to the aforementioned parking lot-managing device with a function dedicated for short-term parking pertaining to the present invention, so that vehicles that park for a short length of time and are the cause of parking garage congestion park in dedicated parking spaces provided inside the parking garage, and further, so that the parking entrance is divided into a general use entrance and a short-term use entrance, a processing for the more congested car entrance is performed smoothly and the parking efficiency can be improved, and also, if a prespecified time is exceeded in the parking garage dedicated for short-term use, a penalty charge must be paid; hence, advantages of preventing long-term parking at the low fee is prevented and mitigating congestion can be manifested. Parking

garages for department stores, supermarkets, and the like where there are many short-term paying customers is also actually beneficial for use office districts and so forth.

4. Brief Description of the Drawings

Figure 1 is a plane view of the overall configuration of the present invention; Figures 2A and 2B are front views of parking tickets; Figure 3 is a block diagram of the configuration of the control section of an automatic fee-adjusting machine; Figure 4 is a flowchart describing the procedure for the processing of entering a parking garage for short-term parking; and Figure 5 is a flowchart [misspelled in source] describing the procedure for processing of leaving the parking garage.

1: parking garage; 1A: general parking space; 1B: short-term dedicated parking space; 1m, 1ms: parking garage entrances; 1e: parking garage exit; 4, 9: ticketing machines; 6, 7, 11, 12: vehicle sensors at entrances; 5 and 10: entrance gate bars; 14: exit gate opening/closing crossing gate; 15, 16: vehicle sensors at exit; P, PS: parking tickets

Figure 1

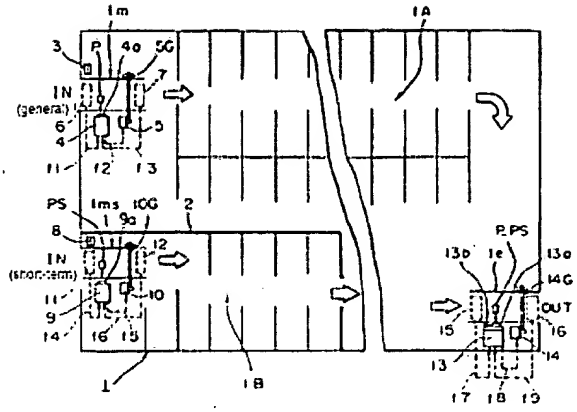


Figure 2A

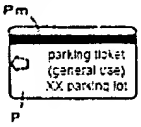


Figure 2B

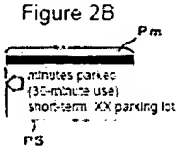


Figure 3

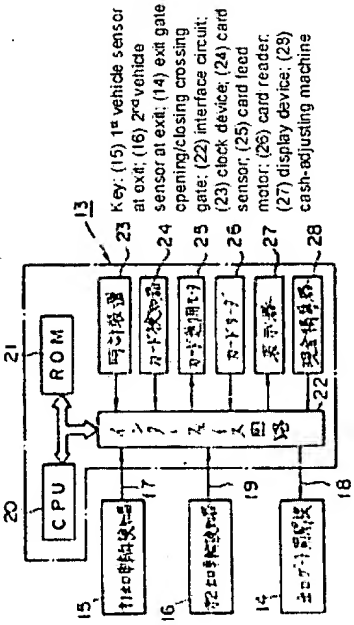
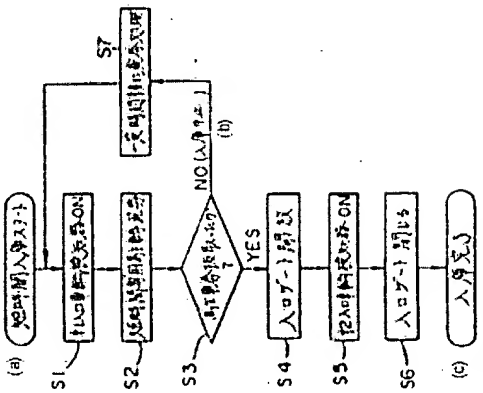
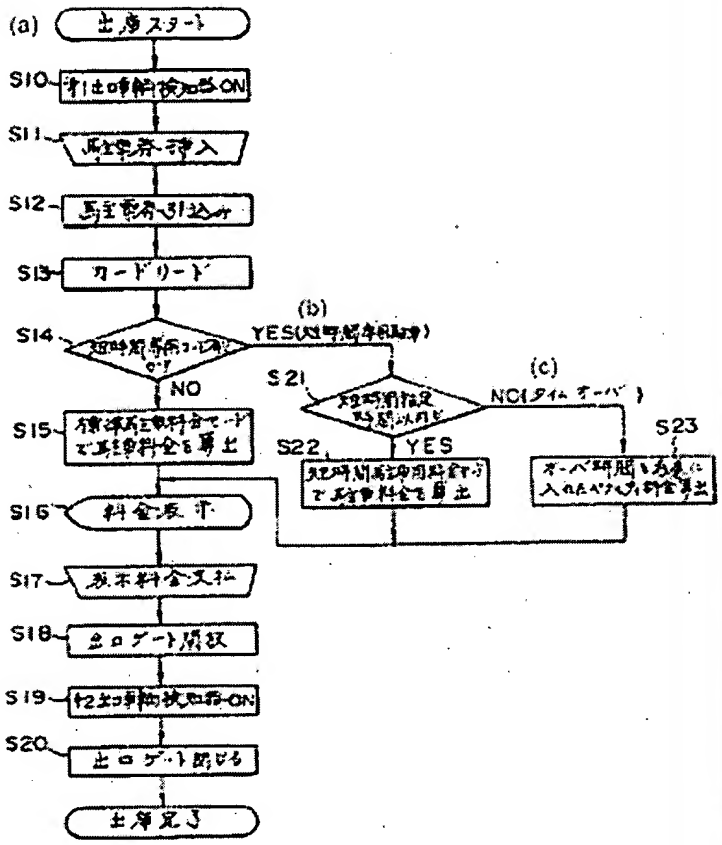


Figure 4



Key: (a) start to enter short-term parking; (S1) turn 1st vehicle sensor on at entrance; (S2) issue parking ticket for short-term parking; (S3) parking ticket taken?; (S4) open input gate; (S5) turn on 2nd vehicle sensor at entrance; (S6) close entrance gate; (S7) processing for [illegible] after certain amount of time; (b) NO (stop entering garage); (c) finish entering garage

Figure 5



Key: (a) start to enter garage; (S10) turn on 1st vehicle sensor at exit; (S11) insert parking ticket; (S12) draw in parking ticket; (S13) read card; (S14) Is dedicated for short-term use [illegible]?; (b) YES (parking dedicated for short-term use; (S15) calculate out parking fee in standard parking fee mode; (S16) display fee; (S17) pay displayed fee; (S18) open exit gate; (S19) turn on 2nd vehicle sensor at exit; (S20) close exit gate; (S21) Is time within short-term regulated time?; (S22) calculate parking fee in short-term parking fee mode; (c) NO (exceeds time); (S23) calculate penalty charge based on exceeded time on display; (d) finish leaving garage